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ABSTRACT

In 1966, James Coleman's massive American schooling survey concluded that family background was principally associated with the existing inequities in cognitive achievement. Coleman's conclusion about schooling's minimal influence on academic performance violated an educational consciousness viewing school as the "great equalizer." Two decades after the Coleman Report, this paper explores schools' compensation for class-related inequalities by reviewing the effectiveness of federal egalitarian educational programs and by describing one state study of the relationship between various environmental variables and pupil achievement. Part I addresses three assumptions underlying the rationale for compensatory education in the early 1960s: (1) the total environment profoundly influences measured intelligence and school achievement; (2) schools are part of the total environment; and (3) improved schooling for disadvantaged children could compensate for inadequacies in measured intelligence and scholastic achievement caused by environmental deficiencies. After reviewing research since 1966, the paper focuses on the issue of sustaining effects. Apparently, a "fade out" of early gains is a continuing problem. Part II describes a Colorado survey for third-, sixth-, ninth-, and eleventh-grade levels using regression analysis techniques. Results suggest that school-related variables do influence achievement, but their impact is restricted to the lower grades--perhaps due to a strengthening of peer and community mores during adolescence. Similar to Coleman, the current survey finds family variables more related to achievement than are school variables. Included are 80 references. (MLH)

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COLEMAN'S INEQUALITY TWENTY YEARS LATER: THE ORIGINS, THE ISSUES AND THE IMPLICATIONS

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COLEMAN'S INEQUALITY TWENTY YEARS LATER: THE ORIGINS, THE ISSUES AND THE IMPLICATIONS

INTRODUCTION

Twenty years ago, amidst an unprecedented national commitment to equalizing educational opportunity, came word of a startling report that challenged a sacred canon of American educational thought. On the eve of the July 4th weekend in 1966, James Coleman and his research associates concluded in a massive survey of American schooling that family background was principally associated with the existing inequities in cognitive achievement in the United States (Coleman, et al., 1966). Appropriately entitled Equality of Educational Opportunity Survey, the so-called "Coleman Report" is probably more famous, however, not for what it found but for what it did not find. After assessing data on some 560,000 children and 60,000 teachers in 4,000 schools, Coleman stated that "taking all of these results together, one implication stands out above all: that schools bring little influence to bear on a child's achievement that is independent of his background and general social content..." Accordingly, it was not Coleman's finding that environmental condition strongly correlated with pupil achievement, but his conclusion that schooling has so little bearing on performance that most violated an educational consciousness that viewed the schools as the "Great Equalizer." According to Coleman, "Differences in school facilities and curriculum, which are the major variables by which attempts are made to improve schools, are so little related to differences in achievement levels of students that, with very few exceptions, their effects fail to appear in a survey of this magnitude."

In testing a national sample of children in grades one, three, six, nine and twelve, Coleman and his staff were apparently of the opinion that equality of educational opportunity meant not only equalizing input (i.e., physical features and per pupil expenditure) but school outputs (pupil achievement on standardized tests). Indeed, their unexpected finding that after controlling for region of the country, remarkably little difference in quantitative educational services existed for blacks and whites received relatively little publicity when followed by the conclusion that the process of schooling, after controlling for such background variables as family structure and economic status, had little or no relationship to scholastic performance.

When Coleman concluded that "equality of educational opportunity...though the schools must imply a strong effect of schools that is independent of the child's immediate social environment," ambitions were abundant that recent federal educational initiatives in pre-school and K-12 education could provide a significant independent schooling effect for children of economic want and social disadvantage. One year earlier, Project Head Start had been launched and Title I of the Elementary and Secondary Education Act had been legislated primarily to provide similar compensation for older environmentally disadvantaged underachievers.

Two decades following the publication of the Coleman Report, it is of timely significance to address the question of whether the schools are compensating for class related inequalities. This question will be addressed by 1) reviewing the effectiveness of federal egalitarian educational programs and 2) by describing a state study of the relationship between various environmental variables and pupil

achievement.

Recent reviews of compensatory education effectiveness have negligible to modest achievement gains associated with pupil participation (Marcus and Stickney, 1980; Stickney, 1982; Mullins and Summers, 1983; Kennedy, Birman and Demaline, 1986), but these compilations are less comprehensive than the current paper. Typically, in synthesizing the research, they do not provide a historic perspective (Stickney, 1982; Mullins and Summers, 1983; Kennedy, Birman and Demaline, 1986) and do not include the most recent research on compensatory schooling (Marcus and Stickney, 1980; Stickney, 1982; Mullins and Summers, 1983). The Kennedy, Birman and Demaline, 1986, report limits its analysis to providing a detailed description of two recently published, large scale Title I/Chapter 1 studies. By addressing compensatory education's underlying assumptions, discussing the evolution of compensatory education assessment, comparing the findings of various time periods, including the most recent research on both Chapter 1 and other remediation strategies (early childhood, elementary and secondary), the current synthesis is designed to offer a more accurate impression of our success in reducing achievement inequalities.

The contents of this paper employs the following format: PART ONE will focus on the effects of compensatory schooling and is subdivided into reviewing the rationale for special interventions for the disadvantaged and reviewing the research on both federal initiatives and other remediation strategies. PART TWO will provide an analysis of achievement test results in Colorado. The CONCLUSION will synthesize the findings of PARTS ONE and TWO, in light of compensatory education's underlying premises.

PART ONE: Pupil Background and Pupil Achievement, A Historic Perspective

THE RATIONALE FOR COMPENSATORY EDUCATION

The early rationale for compensatory education can be summarized by addressing three assumptions, prevalent in the early 1960s, regarding the relationships among the environment, schooling and special interventions.

1. The total environment has a profound influence on measured intelligence and scholastic achievement.
2. Schools are an important part of the total environment.
3. Improved schooling for disadvantaged children could compensate for inadequacies in measured intelligence and scholastic achievement caused by inadequacies in the total environment.

During the late 1950s and early to mid 1960s there was an abundance of sociological, psychological and even anthropological literature on the conditions of the disadvantaged. Typically adhering to a "deficit model" (essentially the interpretation that poverty is intricately interwoven with many attitudes and behavioral patterns that severely impaired a child's chance of succeeding in school), investigators such as Frank Reissman (1962) described millions of American children as "culturally deprived." According to Basil Bernstein (1962), disadvantaged working class students in England spoke with a "restricted code," which, when compared to the more "elaborate" code of the middle class, was characterized as employing fewer modifiers, impersonal pronouns and compound-complex sentences. In this country, David Ausubel

(1964) suggested that lower class children's constant shift from abstract to concrete modes inhibited comprehension, Vera John (1961) reported that lower class children were disadvantaged "in tasks requiring precise and somewhat abstract language" and Martin Deutsch (1964) concluded that lower class pre-schoolers needed a language training program. Employing the term "stimulus deprivation" to describe the home environmental condition of the urban slum ("few if any pictures on the wall" and household objects which tended to "be sparse, repetitious and lacking in form and color variation"), Deutsch suggested that such limited exposure to stimuli adversely affected verbal usage and cognition.

Perhaps the most influential description of the disadvantaged condition was offered by Oscar Lewis (1959, 1961, 1964) who used the term "subculture of poverty" to describe the underclass in many capitalist societies. Basing his conclusions primarily on anthropological inquiry in Mexico, Puerto Rico and New York City, Lewis contended that many impoverished people had feelings of hopelessness, low self images and suspicious attitudes toward the major institutions (including the schools). When alienation and economic want existed amidst affluence, a number of cultural behaviors typically emerged which included matricentrism, present time orientation, impulsiveness, irrationality, disorganization, and general authoritarianism. Consistent with the deficit interpretation, Lewis concluded that the "culture of poverty" was not only impoverished economically, but culturally, and that it would be best "transformed and eliminated."

Whether the culture of the disadvantaged was impoverished was arguable. Indeed, there was often intense debate between these who viewed the

culture of the poor as deficient and others who saw it as simply "different." However, one impression on deficit that was not a focal point for debate was that typically the longer poverty-stricken children remained in school the further they fell behind on standardized measures of achievement. Originally, employed in reference to a hypothetical decline in the IQs of disadvantaged children, the term "cumulative deficit" emerged as a commonly employed label for widening of the achievement gap between children from poor families and the average child.

The cumulative deficit in achievement was perhaps most simply illustrated by David Hawkridge (1968), who pioneered a series of reports by the American Institute of Research (AIR) (Wargo, et al., 1971, 1972) on exemplary compensatory education programs. It was Hawkridge's contention (see Figure) that the learning rate of "badly disadvantaged children" in reading, for example, was approximately two-thirds (2/3) a month of learning per month of instruction or two-thirds the rate of average children who were progressing at 1:1 (a month of learning per month of instruction) or at the 50th percentile.

Following the AIR exemplary program studies, considerable criticism emerged on the wisdom of using grade equivalencies as measurement criteria and a seemingly unending controversy over how much of the cumulative deficit can be explained by possible differences in the learning rates of the advantaged and disadvantaged over the summer. But whatever technical flaws are associated with the AIR analysis, the relevant research of the 1950s and 1960s found a moderate correlation between a child's socio-economic status and school achievement. Typically, poverty stricken children were slower in acquiring basic

academic skills than their middle class counterparts and the resulting deficit was indeed cumulative.

THE ENVIRONMENT AND COGNITION

When Head Start and Title I were legislated, there existed a preponderance of opinion in the relevant social science literature that the environment had a profound influence on a child's measured intelligence and scholastic achievement. Although the relationship between tests of ability and tests of achievement are far from perfect, there does exist a moderate to strong relationship between I.Q. and pupil performance on standardized achievement measures (Anastasi, 1982). Consequently, the so-called "interactionist" position, a common interpretation of the cognitive research, was viewed by many educators as hypothesizing that both human mental development and pupil scholastic achievement were the products of complex relationships between genetic endowment and the environment's unfolding of these innate capacities.

Perhaps the two most influential books representing the environmentalist position were J. McVicker Hunt's Intelligence and Experience (1962) and Benjamin Bloom's Stability and Change in Human Characteristics (1964), which championed the vitality of the interactionist hypothesis, particularly during the early years. A careful reading of these volumes, however, does not always yield agreement with the authors conclusions that early environmental influence had profound, and often irreparable, effects on mental development. Both Hunt and Bloom refer to a host of short term studies which assess the effects of such variables as maternal deprivation, "hospitalism," and boarding home orphanages on the cognitive behavior of children during infancy and

early childhood (see, for example, Spitz, 1945, and Levy, 1947). But while the few longer term studies typically suggested the potency of environmental impact, a significant nurturing effect was usually reported only under rather extreme environmental variation. Moveover, even under this circumstance, there was little evidence that early childhood constituted a so-called "critical period" in human cognitive growth.

Four of the most widely cited behavioral studies of the pre-compensatory era may serve to illuminate the measured relationship between the environmental effect over time. The first is the work of Newman, Freeman and Holzinger (1937) who collected longitudinal intelligence data on nineteen pairs of American and Canadian identical twins separated in most cases before two years of age. When tested in adulthood, the average IQ difference of thirteen pairs raised in similar environments was only 4.4, a figure which approximated the two to three point average IQ difference then reported of identical twins raised together (Erlenmeyer-Kimling and Jarvik, 1963, and Anastasia, 1958). However, a closer look at these data reveal that six of the nineteen pairs reared in the most contrasting environments (by "primitive" mountaineers with only two years of formal schooling vs. parents representing North American middle class normality) averaged 12.5 IQ points.

A positive relationship between environmental circumstance and human development was also reported by Harold Skeels (1939) who not only studied the effects of institutionization on early cognitive behavior but also its impact on life circumstance in early adult hood (Skeels, 1965). In Skeel's early research, he reported on thirteen of twenty-

five "mentally retarded" orphans residing in an "affectionless" institution who were moved by eighteen months of age to another orphanage where they interacted closely with mildly retarded young women. Constituting a contrast group, the remaining twelve children continued residing in the original orphanage. Within two years the mean IQs of the experimental and contrast groups changed dramatically with respective changes of 64.3 to 91.3 and 86.7 to 60.5. Some twenty years later Skeels interviewed all the subjects and reported that the experimental group of children, eleven of the thirteen of whom had been adopted, had become self-supporting and were living lives which appeared indistinguishable from the general population. On the other hand, the control group subjects either remained institutional wards or were living a marginal existence as unskilled laborers or unemployed dependents. In terms of educational attainment, the median grades completed by the experimental and contrast groups were respectively the twelfth and third.

The third and fourth studies germane to this analysis were viewed by Bloom as particularly important in assessing the effects of early disadvantage. The first is the research of E.S. Lee (1951) who measured the intelligence of several groups of black children who spent varying periods of time living in Philadelphia. Lee found that while the IQs of children born and raised in Philadelphia remained almost constant between grades one and nine, the IQ change for black migrants (usually from the South) who moved to that city by age six was six points. Because children who arrived by age nine had a lesser IQ gain of four points and arrivals at eleven enjoyed only a two point increase, Bloom concluded that the earlier the exposure to an enriched environment (in this case, Philadelphia), the greater the cognitive effect. The fourth

study was conducted by James Kirk (1958), an investigation Bloom regarded as "crucial" in determining the relationship of change to the environment. Kirk reported on 81 mentally retarded children (IQs 45 to 80) who attended preschools and compared them to similar control group children with no preschool experience. Kirk found that the IQs of most experimental preschool children increased during their educational experience (the IQs of the controls did not) and that these gains were sustained after exiting the preschool.

The Newman, Freeman and Holzinger twin study and the Skeels investigations of the short and long term effects of institutionization suggested that under circumstances of rather extreme environmental variation, human beings will display rather profound differences in cognitive behavior. If, however, the degree of environmental difference was relatively small, the research data preceding compensatory education made a strong case for the influence of heredity. For example, if two identical twins were separated as toddlers and reared in rather similar environments (in terms say of dialect, social and economic status, educational opportunity), the IQ differences at adulthood rarely exceeded seven points (Jensen, 1975). When comparing this differential to the approximately twelve point IQ difference between fraternal twins reared together among siblings reared in the same home, and the fifteen to sixteen point variation reported between genetically unrelated children reared together (Jensen, 1975), it would appear that environmental differences within a given community account for only a modest percentage of the IQ variation. If the environmental variation is substantial, differences in measured intelligence may be substantial. But at some threshold level of environmental adequacy, there appeared to be an unchallenged unfolding of a child's genetic endowment. Whether

the subthreshold level included the culture of poverty or was confined principally to conditions of gross motor and sensory restrictions (infants strapped to boards or children reared in virtual isolation in attics) was a primary focal point of the nature-nurture controversy.

Regarding the Lee investigation of residence in Philadelphia and the Kirk report on the effects of preschool, one must accept their interpretations by Bloom with caution. Bloom argued that these studies supported his hypothesis that "variations in the environment have the greatest quantitative effect on a characteristic at its most rapid period of change..." and that it is during childhood that at least half of human intelligence develops (perhaps 40% by age four; 80% by age eight). Moreover, Bloom assumed that "loss of development in one period cannot be fully recovered in another...that is, deprivation in the first four years of life can have far greater consequences than deprivation in the next ten years from age eight through seventeen." Indeed, children reared in "extreme" environments may lose an average of 2.5 IQ points a year from birth to four years of age.

Since Lee only measured IQ change up to grade nine, did this study lend credibility to the hypothesis that the environment's greatest impact occurs during the early years? The fact that children's IQs change six points in nine years (grade one through nine), four points in five years (age nine or fourth grade through ninth grade) and two points in three years (age eleven or sixth grade through ninth grade) may only suggest that the longer the environmental exposure, the greater the change. If those black southern children who arrived in Philadelphia at ages nine and eleven had been followed for nine years (to ages eighteen and twenty) and IQ changes were only two to four points, it would then

support the significance of early environmental exposure.

But Lee did not include such longitudinal data. Moreover, Kirk did not find that the early childhood experience of mentally retarded children had irreparable effects on measured intelligence. Kirk does report that the preschool children enjoyed a rise in IQ, but what Bloom does not include in his analysis is that typically the IQs of most children in the community contrast group, after entering first grade or a special class at age six, increased to an IQ level approximating the experimental preschool children. Indeed, Kirk comments that if replications of his study produce similar findings"...it could mean that preschools for mentally handicapped children are not necessary, since the children will accelerate their rate of development after entering school at the usual age of six." Kirk does, however, cautiously recommend preschools for mentally handicapped children but, rather than support critical periods, his research can be interpreted as not only challenging the "earlier the better" assumptions but questioning the irreversibility of early childhood experience.

THE SCHOOLS AND COGNITION

If there was research questioning the value of preschool education prior to the launching of compensatory education, what research existed to suggest that schooling made a difference and could compensate for environmental disadvantage? The significance of formal schooling was supported by research from Europe during World War II when schools in Holland were closed for a long period, accompanied by a decline in IQ of many Dutch children. Also, during the 1960s in New York City and in Prince Edward's County, Maryland, a teacher's strike and a desegregation

battle respectively forced closure of those systems for varying periods with apparently significant adverse effects on achievement (Jencks, 1972).

Regarding pre-Head Start and Title I compensatory initiatives for culturally disadvantaged children, by 1965 there existed several promising experimental preschool programs and a host of programs at the elementary and secondary level. Two of the most influential elementary and secondary programs were the well publicized Project Bannecker in St. Louis, begun in 1957 under the energetic leadership of Samuel Shepard, and the large scale Higher Horizons program in New York City (U.S. Commission on Civil Rights, 1967). Begun in 1959, by 1962, Higher Horizons was providing comprehensive K-12 compensatory services to some 64,000 children in the Harlem area. In 1963 the project was described by Harry Passow as "...perhaps the most widely known enrichment program [and] now being adopted in numerous other communities" (Passow, 1963) and later cited by White House aide, Roger Freeman (1969), as a model for many of those shaping DHEW's proposals for Title I ESEA. Among the major program components of Higher Horizons were special teacher training in teaching the disadvantaged, extended counseling services, the broadening of cultural background by field trips and the employment of special remedial teachers to upgrade the basic skills.

Higher Horizons was also associated with some rather impressive pupil achievement gains. On November 4th, 1959, less than a month after the program wad initiated, 855 third grade pupils took the Metropolitan Reading Test (MRT) and obtained a mean grade score of 2.73. In April, 1960, the mean MRT scores for the same 855 stood at 3.46, representing more than a seven month gain in less than a six month period and thus

closing the achievement gap (Wrightstone, et al., 1964). Higher Horizons was demonstrating empirically what Project Bannecker and many other local compensatory programs were sensing experientially: that schools could be the "great equalizer" and provide compensation for cultural disadvantage.

Faith in the powers of schooling in combating poverty and its associated ills was typically endorsed by members of education's scholarly community. At a Ford Foundation conference on education in depressed areas at Columbia University in the summer of 1962, Martin Deutsch saw the school as being able to "significantly reduce the attenuating influence of the socially marginal environment" (Passow, 1963). At this New York gathering, Kenneth Clark commented that "Education has been one of the most effective means for social mobility in American society" and that our further problems only differ from our past dilemmas in that "it will involve different and larger groups of...disadvantaged individuals." Two years later, in the summer of 1964, the U.S. Office of Education sponsored a "Research Conference on Education and Cultural Deprivation" at the University of Chicago, which attracted such scholars as Basil Bernstein, Lawrence Kohlberg, Martin Deutsch, Erik Erickson, Arthur Jensen and Thomas Pettigrew (Bloom, Davis and Hess, 1965). Benjamin Bloom and his colleagues summarized the conference's findings by stating, "What is needed to solve our current, as well as further, crisis in education is a system of compensatory education which can prevent or overcome earlier deficiencies in the development of each individual."

During the following year, the system broadened its offering with the initiation of Head Start and the legislation of Title I, ESEA.

THE RESEARCH ON COMPENSATORY EDUCATION

The findings of the research on federal programs designed to remediate class related inequalities approximates the trends in investigating the effects of schooling in general. Accordingly, this section will integrate the research on compensatory education with the educational research on education for a larger population, and in so doing, divide the twenty year since Coleman into three periods of investigation: 1) 1966-1976: Educational Ineffectiveness and The Search for "What Works," 2) 1976-1980: Educational Effectiveness and Disseminating "What Works" and 3) 1980-1986: The Issue of Sustaining Effects.

1966-1976 EDUCATIONAL INEFFECTIVENESS AND THE SEARCH FOR "WHAT WORKS"

The early research on Title I and compensatory preschool programs did little to demonstrate that federal egalitarian initiatives in education were creating the "independent effect" that Coleman found lacking in American schools. Following two frustrating years of trying to compile Title I effectiveness data from a variety of assessment measures employed by thousands of local districts, in 1967 Congress ordered the employment of standardized reading and math scores as the effectiveness criteria. A year later, the U.S. Office of Education (USOE) conducted the first systematic national study of Title I by sampling 465 of 10,544 districts receiving Title I funds and obtaining grades two, four and six reading scores on some 11,000 pupils (Education...1969). But this 1968 study did not find a compensatory effect, concluding that Title I reading had virtually a random chance either of increasing or decreasing the participants achievement scores when compared to similar non-participants. Thus, the survey found evidence that some children were

benefiting from the program and that proportionately, a greater number of these gainers were from higher socio-economic families. However, on the average, "Pupils taking part in compensatory reading programs were not progressing fast enough to allow them to catch up... For both participants and [similar] non-participants that 'deficit' grew progressively greater in each succeeding grade testing."

The following year a second national study of Title I effectiveness sampled the schools. This 1969 Title I survey employed a research design similar to the 1968 evaluation and yielded equally disappointed results (McLaughlin, 1974).

In 1969, additional discouraging conclusions were being reported on Project Head Start and other preschool compensatory efforts. In a longitudinal assessment of the project's impact, Ohio University and the Westinghouse Learning Corporation (Ohio-Westinghouse, 1969) sampled 104 Head Start centers nationally. Although many carefully planned, structured full year programs were significantly improving the participants' aptitudes (children attending only in the summer or in the more unstructured, socialization programs were less likely to reap cognitive benefits), there was little evidence of any sustenance of the initial gains beyond the second grade. By the end of the decade, several experimental preschool programs for socio-economically disadvantaged children were observing a similar "fade out" phenomenon of earlier gains. Whether it was the Bereiter-Engelmann behavioristic model at the University of Illinois, the Early Training Project cognitive design in Murpheysborough, Tennessee, or the Perry Preschool Project, with its Piagetion emphasis, in Ypsilante, Michigan, the IQs of participants were typically little better than those of the controls by

the middle elementary school grades.

But evaluating individual programs appeared to be a logical alternative strategy in assessing the effectiveness of compensatory education as a whole. Large scale studies such as Ohio-Westinghouse and the 1968 and 1969 national studies of Title I may have been contaminated by what can be called a "canceling effect" (Stickney, 1977). Subjects in national studies constituted a heterogeneous population exposed to an almost infinite variety of teachers employing a myriad of methods. Accordingly, what "works" for some children may not work for others, and an averaging of such effectiveness and ineffectiveness may suggest that, in totality, the program has had no measurable impact.

The Center for Educational Policy Research (CEPR) at Harvard (McLaughlin, 1971) and the RMC Research Corporation (Foat, 1974) conducted significant exemplary compensatory program searches in the early 1970s. Respectively scanning some 750 and 2,000 compensatory projects nationwide in the early 1970s, CEPR and RMC found that many programs appeared to be effective. While RMC found that its eight exemplary projects had no single key to success, CEPR found that every highly structured program (only 34 in number) in the several hundred programs reviewed were producing a month of learning per month of instruction (1:1) gains. But the most extensive and publicized search for exemplary programs was conducted by AIR (Hawkridge, et al., 1968, 1969; Wargo, et al., 1971, 1972). Under contract to USOE, AIR identified 21 "successful programs" from preschool to grade twelve in its first two reports which became the basis for the <u>It Works Series</u> (1970), published by USOE, that gave descriptions of exemplary programs. Using better than 1:1 pupil gains as the criteria for success (since

only at that rate could they "catch up"), AIR eventually identified 41 exemplary programs by 1971 of the more than 3,000 projects reviewed. The components AIR identified as "most common" to all 41 successful programs at all levels (preschool through high school) were "a) academic objectives clearly stated and/or careful planning, b) teacher training in methods of the program, c) small group or individualized instruction, d) directly relevant instruction (for secondary school students), and e) high treatment intensity and active parental involvement."

1974 witnessed the publication of the eight RMC models of compensatory education and the creation by USOE of the National Diffusion Network to disseminate information on exemplary programs. Beginning also in 1974 was the Joint Dissemination Review Panel (JDRP), a Consortium of researchers from NIE and USOE gave scholarly scrutiny to nominated projects and passed judgment on their authenticity and exportability.

Now that evidence was amassing that compensatory education could work, that there were commonly effective program characteristics and that an assessment and dissemination system had been established, USOE began development of what was thought to be a more valid evaluation metric. Rather than continue to measure pupil gain in grade equivalents or percentiles, USOE introduced in 1976 a new measurement tool entitled Normal Curve Equivalents (NCEs). NCEs are similar to percentiles in that both an NCE and percentile of 50 are average and the numbers 1 and 99 represent the extreme low and high. Percentiles, however, are not uniformly interrelated and thus mean different things at various points in the distribution. For example, a percentile point gain is much greater at the extreme ends of the normal curve than it is in the center. On the other hand, NCE change takes on uniform meaning

throughout the distribution (Tallmadge, 1976).

Technical advantage aside, perhaps the most valuable feature of NCE reporting is that it rids the Title I evaluator of having to compare the Title I and average pupil growth rates. No longer was a program's success contingent upon 1:1 or better gains but simply on an NCE gain greater than zero.

Since NCEs take on different meanings at different grade levels, it is difficult to determine just what NCE gains really mean in terms equaling or exceeding the growth rate of the average child. Unfortunately, it appears that many educators interpret any NCE gain as evidence of catching up, but this is not always the case. For example, let's assume a child progresses from the 30th to the 32nd NCE over a six month period. This does not guarantee a catching up, any more than a six minute paced miler, in a race with a mean pace of five minute miles, will catch up if a refreshing splash of water increases the pace to 5:45. Like the 5:45 runner, the child now growing at the 32nd NCE is still at a substantially slower 32nd NCE growth rate. This means that, despite the relative gains, the five minute milers in front still become smaller and smaller to the eye of the 5:15 runner and that the 32nd NCE student is till falling further and further behind the average student. In both cases the gap is being narrowed but is not being closed.

1976-1980: The Schools Become Effective

With Title I having identified "successful" programs and research accentuating on effective teaching, the picture during the remainder of the seventies decade becomes much brighter regarding the effects of

instruction and schooling. For example, the reports by the Far West LAB on the The Beginning Teacher Evaluation Study (Denham and Lieberman, 1980, and Barak Rosenshine, 1978) point to the educational significance of "academic engaged time" and "direct instruction." From Detroit and London came reports by Ron Edmonds (1979) and Michael Rutter (1979) pointing to such variables as administrative leadership and climate of expectation as correlating moderately with pupil achievement.

In keeping with the growth of education's new optimism, compensatory education also reaped the benefits of the positive trend. In 1978, NIE's Compensatory Education Study (1978) released results indicating that pupils enrolled in fourteen elementary compensatory projects around the nation, all of which had been nominated as meritorious by a locality and state department of education, were making significant improvement. Typically, the first and third grade study participants made impressive achievement gains in reading and math, which were reportedly maintained over the summer months.

Initiated, as well, in the latter part of the 1970s was the Sustaining Effects Study, perhaps the most significant investigation to date of the effectiveness of compensatory education. Beginning with the 1976-77 school year, the Systems Development Corporation assessed the achievement of some 120,000 students in a representative national sample of roughly 300 elementary schools for three consecutive years. Apparently, funding problems caused considerable delay in releasing the final report on compensatory education's three year effect, but by 1980 the results of the study's first year were available. Reported in percentiles, rather than grade equivalents, an early assessment (Wang, 1980) showed compensatory education students (CE) outgaining similar non

CE students in grades 1-3 in reading and 1-6 in math. Pupils in grades 4-6 in reading performed no better than the controls. Most participants, however, retained much of their school year learning over the summer.

In the preschool arena, the remarkable perseverance of many of the originators of the experimental projects led to pooling of their data and in the conducting (in 1976-77) of a common follow up study of the original experimental and control groups. Consortium coordinator Richard Darlington and his associates (Darlington, et al., 1980) tell us that although the experimental preschool had no sustenance in terms of measured intelligence (IQ "...tapering down to smaller but typically affects three or four years after preschool and vanishing thereafter"), it was associated with placement in special education classes and grade retention. Of the approximately 2,700 children in the eleven original experimental preschool programs, some 1,600 were available for the 1976-77 Consortium follow-up study. Appropriate data existed on 802 subjects in seven projects and revealed that the preschool participants were nearly twice as likely as the controls to be neither recommended for special education or to repeat a grade.

In summary, the seventies decade ended with not only a greater optimism regarding the effects of schooling but with the surfacing of greater attention to sustaining effects. The Compensatory Education Study had taken the uncommon initiative of measuring data over a calendar year (fall to fall), and the Sustaining Effects Study, following a similar reporting format, promised to provide further information on sustenance in years two and three. In addition, research by the Consortium on Longitudinal Studies continued unabated into the middle eighties.

Moreover, in 1979 Title I began mandating the collection of sustaining effects achievement data. Thus, we should now have a better opportunity of assessing the effects of schooling both in the short run and over time.

1980-86: THE ISSUE OF SUSTAINING EFFECTS

Until recently, there has been a paucity of literature on the sustaining effects of learning, and even today's data are so meager in constitution that most of it may serve principally to generate questions rather than provide answers. Commenting on the limited research by the university psychological community, Neisser (1978) states that an institution of higher learning

> depends heavily on the assumption that students remember something valuable from their educational experience. One might expect psychologists to leap at the opportunity to study a critical memory problem so close at hand, but they never do. It is difficult to find even a single study, ancient or modern, of what is retained from academic instruction. Given our expertise and the way we earn our livings, this omission can only be described as scandalous!

While due criticism should be directed to many researchers on learning for short sightedness in measuring only the initial effects of instruction, there are several difficult problems associated with longitudinal data collection which makes such a design difficult to implement (Harnquist, 1977). Moreover, collecting sustaining effects data can be very expensive (Stonehill, 1986). Thus, there is a focus in education research on a phenomenon which is difficult to measure and often costly, and definitive data on the sustenance question may be slow in coming.

Two principal issues accompanying sustaining effects research are 1) how long is learning sustained? and 2) what instructional methods work best

over the long haul? In reviewing this literature, this section will address these questions by first discussing the relatively research-rich preschool programs and then by turning to the sustenance of learning in elementary and secondary schooling.

Preschool

Typically, the research on the effects of preschool programs for disadvantaged supports the conclusions reached by the Consortium on longitudinal studies. In a recent review of the Head Start research since 1970 (the year after the Ohio-Westinghouse report) Hubbell (1983) concludes that generally programs report subject cognitive gains during participation in the project. However, most of the 21 programs in her analysis that kept cognitive data a year or two following the Head Start experience did not report cognitive sustenance in kindergarten or first grade. Interestingly, a few studies kept scholastic data for several years (ranging from grade three to high school) and about half found a small, but statistically significant, effect in some areas of achievement. The most impressive results, however, were in the affective domain. Similar to the Consortium, Hubbell suggests that Head Start's greatest benefit is its moderate association with lower special education placement and grade retention. Regarding the issue of which models work best, Hubbell concludes that at least in the cognitive domain there is probably no differential effect. Highly academic models often demonstrate greater short term gains in IQ and scholastic achievement, but over the long run differences typically disappear.

Additional longitudinal studies of preschools for the disadvantaged have been published by independent researchers and by members of the

Consortium. Evans (1985) reports on an eleven year follow up study of 44 (of the original 92) low income, predominantly black, high school students who had two different preschool experiences: one year of a high structured, direct instruction DISTAR type program and a one year exposure to a conventional Head Start program. A control group was also included in the study, and no achievement differences were found among the three groups. On the other hand, Miller and Bizzell (1984) report that a one year Montessori preschool experience was associated with nearly grade level performance in reading and math for low-income black tenth graders. Similar results were also reported for a group of disadvantaged tenth grade females who had attended a one year DARCEE (combination of highly verbal and visual learning) program. In addition, the Montessori program was positively associated with fewer pupil suspensions. Their study also included long term data on a behaviorally oriented Bereiter-Engelmann model and a traditional pre-kindergarten, but neither program appeared to have much cognitive or affective benefit over time. Nor were differences in treatment effect were not reported in a follow up study of Home Start, a three year (1972-75) DHEW preschool demonstration project which provided educational services for children and their parents at home. Two years following participation in the program there were no significant differences found between Home Start and a comparison Head Start group on a variety of outcome measures (Bache and Nauta, 1979).

Recent reports by the Consortium members tend to confirm and expand their findings of the late seventies on sustaining effects. Reiterating the relationship between participation in her Consortium Early Training Project and reduced special education placement and grade retention, Susan Gray has also reported (Gray, 1983) that project females are more

"planful and realistic" in viewing the future, have higher grade point averages and a slightly higher high school graduation rate. Lawrence Schweinhart and David Weikart, principal investigators of the Consortium's Perry Preschool Program, have recently reviewed the data of the Consortium and other "scientifically rigorous" experimental preschool programs for the disadvantaged. Although there is little reported evidence that the initial IQ gains last beyond the age of ten, six of the seven projects show sizable differences between the experimental and control groups in scholastic placement (grade retention and special education placement), and three projects report rather impressive differences favoring the experimentals in drop out reduction. It is important to note that the projects that did not find these effects apparently never attempted to measure them. In other words, all of the seven projects which kept data on scholastic placement and drop out prevention found positive relationships between these behaviors and the preschool experience (Schweinhart and Weikart, 1985).

Apparently, the only experimental preschool program to indicate durable scholastic gains is the Perry Project in Ypsilanti, Michigan, which has reported achievement benefits up to age nineteen. The Perry Project has also kept data on "social responsibility" and socioeconomic success and has reported that at age nineteen the control subjects are more likely to be arrested or detained, become pregnant, be unemployed or receive welfare assistance (Schweinhart, et al., 1985).

Is there any evidence that some experimental preschool programs have greater enduring effects than others? Consortium members, Karnes and Miller, contend that there are. After comparing several Consortium models, they suggest that the more open-ended and child initiated

projects are associated with more long term school success than the more highly structured teacher directed programs (Karnes and Miller, 1983).

Kindergarten and Elementary School

In addressing the sustenance of equalitarian initiatives beyond the preschool years, it is appropriate to begin by reviewing programs which originate at the kindergarten level. It is appropriate, as well, that Project Follow Through, the most thoroughly researched federal education program encompassing the kindergarten year, be included in this analysis. Legislated in 1969 (the year that Ohio-Westinghouse had determined that Project Head Start had no enduring cognitive effects), the project was designed originally to sustain the short term gains that Head Start had attained during the critical preschool years. However, it is unfortunate that there were few attempts to measure the cognitive effects of Follow Through on former Head Start children. Rather than amass any significant longitudinal data on participants who had completed both programs, Follow Through evolved principally into a research project, which compared the short term effects of varying curriculum models. In retrospect, however, there is some evidence that Follow Through may be standing on its own, with long term benefits, regardless of its participants' preschool experience.

Typically, Project Follow Through began either during the year normally reserved for kindergarten or in grade one and continued through the third grade. While there is some evidence that a full day kindergarten experience in itself has some sustained cognitive benefits for both average and underachieving students (Humphrey, 1983; Nieman, 1981), Follow Through often exposed the same children to one of fifteen

treatment models for the K-3 four year period. Considering the infrequency of multi-year participation within a single instructional design, Project Follow Through offers a potentially rich data base for assessing the sustaining effects of early childhood education.

Recent reports conclude that longitudinal data from at least two of the models are suggesting some sustaining cognitive effects. Identified as one of the most effective Follow Through models in a 1977 ABT Associates study of short term scholastic effects (Stebbins, et al., 1977), the Direct Instruction model is now being associated with greater scholastic performance into the high school years. Becker and Gerten (1982) studied the Direct Instruction model in five diverse Follow-through sites and reported that former participants in these three year (grades 1-3) programs were superior to the controls in WRAT reading (decoding), spelling and math problem solving in the fifth and sixth grade. The investigators lamented, however, that following the program the Follow Through children "invariably lose ground" when compared to children in the national norm sample. In a more recent report of a longitudinal study of 1500 Direct Instruction Follow Through children, Gersten (Gersten, et al., 1984) reported either positive cognitive or affective pupil benefits at the high school level associated with each of the six sites investigated. Four of the six sites had data suggesting greater experiential group benefits in some areas of high school achievement than that experienced by comparison groups. In four sites the drop out rate was significantly lower for the Follow Through students. In one of the most economically impoverished sections of New York City, Meyer (1984) compared a Direct Instruction Follow Through school and a demographically similar non Follow Through school in the Ocean Hill-Brownsville section of Brooklyn. This investigation found the Follow

Through school associated with both significantly higher ninth grade reading and math scores and with higher school graduation. Indeed, the ninth grade reading and math scores for most experimental subjects show them to be performing at, or just below, grade level.

Research on the Parent Education Follow Through Program (PEFTP), another of the fifteen federally sponsored models, also suggest long term benefits. Szegda (1984) reviewed the data collected at five sites and reported a positive impact through the ninth grade. In a study she conducted of 51 PEFTP Follow Through graduates in Richmond, Virginia (Szegda, 1984), the ninth and eleventh grade participants at the ninth through eleventh grades performed better than an older sibling comparison group on some sections of aptitude and achievement tests. Although a PEFTP Follow Through study by Revicki and Self (1980) found no evidence of participant achievement variation associated with differential preschool experience, the investigation did conclude that the PEFTP graduates maintained their initial achievement gains through at least fifth grade.

Inexplicably, the positive results on the Direct Instruction and PEFTB models were not identified in an earlier national longitudinal study of the total Follow Through Program and each of its various teaching models. According to this USOE investigation (Maraschiello, 1979), only the Educational Development Center Model (EDC), a British Infant School, holistic strategy, correlated consistently and positively with pupil achievement through grades 4-9.

Despite a mandate since 1979 that Title I and Chapter 1 elementary and secondary school programs collect data on sustained effects, the

literature includes only a handful of such reports. Relatively early reports out of Rhode Island and Arizona show Title I students making substantially greater gains the first year, followed by regression during the second year of testing. In the Rhode Island study (DeVito and Rubenstein, 1979) of state-wide Title I participation from 1974-76, second and fourth graders were divided into two participant groups: students who exited the program after the first year of testing (apparently because they "graduated out") and pupils who remained in the program for the two year duration of the study. The greater second year losses were experienced by the one year group once they had returned to the regular classroom. For example, one year second graders gained a dramatic twenty NCEs (28.2 to 48.9) as Title I participants and then fell to 40.7 NCEs at the end of the third grade. Two year participants also grew considerably during their first participatory year (28.2 to 43.0 NCEs) but their second year decline (while still in the program) was slightly less than the "graduates," dropping over six NCEs (43 to 37.7) vs. approximately eight NCEs (48.9 to 40.7) for the one year group. Despite the second year regression, both one year and two year participants, enjoyed significantly higher NCE reading scores than they had at program entry. The Rhode Island investigators attributed the second year regression to substantial summer losses, a phenomenon not reported in the Arizona study of seventh through ninth graders in Title I in Tucson between 1977-79. Typically, participant NCE gains were not as great during the second year but most seventh and eighth graders grew slightly while the average ninth grader dropped an infinitesimal .2 NCEs. Once again, participants' two year participation at all three grade levels left them better off, in terms of NCE status, than they probably would have been without Title I.

More recent longitudinal studies of individual Title I/Chapter 1 projects report a positive association between the amount of program participation and achievement gain. A three year (1979-82) investigation of elementary students in Saginaw, Michigan (Claus and Girrbach, 1982), found compensatory education three year students gaining more in reading and math than pupils participating for two years or less. Achievement data collected over two years (1979-81) by Lavin and Sanders (1983) in six northeastern Massachusetts communities found computer-assisted Title I/Chapter 1 projects correlating with better than expected achievement gains during students' longitudinal participation. A sustained effects study of over 2,000 elementary and middle school children in Columbus, Ohio (Brown and Duffy, 1984), shows overall gains between the fall of 1982 and the fall of 1983 but the gains are not constant throughout the three testing periods (September, 1982; May, 1983; October, 1983). A substantial NCE gain in reading (29.0 to 37.1) was reported between the fall and spring testing, but an NCE decline occurred (37.1 to 34.6) between the spring and following fall testing. Nevertheless, it is important to note that participants were still at a higher NCE level than they would have been without compensatory education.

The commonly reported regression following Title I program "graduation" or during the second year of Title I participation may have less to do with any relative decline in achievement and more to do with errors in measurement and/or losses during the summer. In order to gain a more definitive impression of compensatory education's multi-year benefits it is necessary to return to the Sustaining Effects Study (SES) and draw from the yet-to-be-published Sustaining Achievement Study of Chapter 1 (SASC). Both reports address achievement gain during program

participation and include research and commentary on testing intervals which include the summer month.

After a comprehensive analysis of the three year data (1976-79), investigators at the Systems Development Corporation have released the final report (Carter, 1983) of the Sustaining Effects Study, the largest assessment of compensatory education in history and the largest study ever of elementary education. Similar to earlier reports on the first year (1976-77) achievement of participants, the final report finds compensatory education associated with significant achievement gains during single year participation with little or no loss during the summer months. Moreover, the final report concludes that single year "graduates" continue to perform at their increased level during the following year. However, pupils participating for two years before promotion, suffer an achievement decline the year after discontinued services. More discouraging is the finding that only those who are among the least educationally disadvantaged appear to experience any short term or multi-year achievement benefits. The most educationally disadvantaged children (those who remain in the program for all three years) do not achieve at a better than expected rate during any measured period of their participation. Finally, there appears to be no sustained or delayed effects of Title I when elementary school participants reach junior high school.

Prepared by a special study group from four regional Chapter 1 Evaluation Technical Assistance Centers, the SASC study (Gabriel, et al., 1985) analyzed the spring of 1982 and spring of 1983 achievement scores of some 66,500 pupils in seventeen school systems throughout the country. The study's principal finding was that annual testing (spring

to spring or fall to fall) was far superior to fall to spring school year testing because the substantial achievement gains typically reported over the six month school year are probably exaggerated. Following a year of Chapter 1 participation, students return the next fall at a significantly lower achievement level than they had reportedly attained the previous spring. But inevitably they demonstrate a similar substantial gain between the fall and spring of the second year. This up and down so-called "sawtooth effect" (Stonehill, 1986) is inexplicable, but speculation has focused on varying learning rates during the school and summer months, increasing complexity of skills at the beginning of each grade level (Gabriel, et al., 1985) the administration of the fall test before the norming date (Keesling, 1984), and publishing error in contructing extrapolated fall norms and statistical regression (Hoepfner, 1980). The fact that the SES renormed its fall testing and then found much more modest school year gains lends credibility to the extrapolated norm hypothesis. In addition, the Technical Assistance Center staff provides fall-spring test data on local samples of relatively high achieving, non-Chapter 1 students which shows a similar "sawtooth" phenomenon, thus neutralizing contentions that Chapter 1 students retain less information and demonstrate significantly greater losses over the summer than their more advantaged counterparts.

Significantly, the spring to spring achievement scores reported in the SASC study show NCE increases in reading and math for Chapter 1 students, regardless of educational disadvantage. The study assessed the calendar year achievement of two principal groups: a "compensatory" sample, which remained in Chapter 1 for two years and represented the greatest educational need, and a "remedial" population, which

participated for only a single year and is less educationally disadvantaged than the "compensatory group." The "remedial" group showed rather substantial achievement gains, as evidenced by one cohort climbing from the 31st to 39th percentile in math and 31st and 38th percentile in reading. There was evidence of a modest percentile decline in reading, however, during the year following "graduation" from the program. Consistent with the trend reported in SES, "compensatory" participants did not enjoy the benefits of their less educationally disadvantaged counterparts. But unlike SES, there was evidence of program impact for the compensatory group over a calendar year, moving respectively from the 26th to 29th and 29th to 32nd percentile in reading and math.

The SES also concluded that while the average CE student does somewhat better than the non CE counterpart in most grade-subjects measured, the achievement gap between CE students and regular students continues to widen. Interestingly, however, the SES achievement gain data on CE and regular students does not indicate a differential growth rate during the school year between educational disadvantaged and advantaged students (Ginsbery, et al., 1981). The widening achievement gap is likely caused by the fact that each year higher achieving CE students graduate to the "advantaged" sample and poorly achieving "advantaged" children enter the "disadvantaged" CE students. Accordingly, the report raises questions about the validity of the "fan spread" or cumulative deficit hypothesis.

Regarding components of effective schooling, apparently SES only measured instructional activities for a single fall-spring testing period. Consequently, its finding that such variables as opportunity to learn, frequency of feedback and planning/evaluating had a small

relationship to achievement is of little value in investigating what pedagogical strategies are effective over time.

In summary, although the research on sustaining effects offer encouragement for the durability of some compensatory treatment, it is apparent that a "fade out" of early gains is a continuing problem. At the preschool level, this was reported as early as 1969 and at the elementary and secondary school level there is evidence that it was occurring even earlier. In a previous section of this paper, it was mentioned that Higher Horizons, the large, influential pre-Title I compensatory education program in New York (1959-1965), had reported impressive first year school gains between November, 1959, and April, 1960. However, the early positive reports did not include the longitudinal reading data that Wrightstone (1964) had gathered on 833 third grade pupils the following May of 1961, some eighteen months after they had taken the fall pretest the year before. During the thirteen month interval from April of 1960 to May of 1961, they gained only 7.5 months (3.46 to 4.21), a level not statistically different from the expected grade score of other New York City children from similar backgrounds. Wrightstone's evaluation collected longitudinal math and reading data up to the sixth grade and Higher Horizons' students enjoyed a three month advantage in math over contrast groups at the sixth grade testing. In reading, however, the report concluded that "from the data presented, it may be concluded that the Higher Horizons' pupils included in this study did not show greater gains in reading comprehension from third to the sixth grade than did pupils in comparable non-Higher Horizons schools."

Additional commentary on the sustaining effects of compensatory

education will be provided in a later section. During the interim, PART TWO of this analysis will go beyond compensatory education in assessing the variables associated with pupil achievement and inequality.

PART TWO Pupil Achievement and Pupil Background: A Colorado Survey of Performance, Family and Schooling

The second part of this analysis of Coleman's inequality describes a study of the relationship between pupil achievement and environmental circumstance in Colorado. The test results and demographic data forming the basis for this investigation were collected by the Office of Planning and Evaluation at the Colorado Department of Education.

In response to a 1985 Colorado legislative mandate (The Educational Quality Act of 1985) that there be a state-wide uniform assessment of pupil achievement, in April of 1986 the Iowa Test of Basic Skills/Tests of Achievement and Proficiency were administered to Colorado public school pupils. Targeted for this testing were all students in grades 3, 6, 9 and 11, the only exemptions being among pupils classified as non-English speaking/reading or those receiving more than 50% of their instruction from special services. For each of the 176 school districts tested, the Colorado Department of Education compiled information on familial and educational background.

In keeping with a common assessment of schooling effectiveness, standardized test scores are being used in Colorado as a principal determinate of a school district's instructional quality. But, similar to Coleman's findings, environmental factors may be associated with Colorado pupil performance that are independent of the effects of schooling.

In terms of magnitude and detail, the Equality of Educational Opportunity Survey (Coleman, et al, 1966) is much larger than the current investigation in Colorado. In what was apparently the second

largest social science survey in the history of the western world, the "Coleman Report" collected data on some 560,000 students and 60,000 teachers in 4,000 schools nationwide. Included in the 1966 report was comprehensive questionings of superintendents and principals, detailed composites on teacher background and perspective, and a lengthy questioning of students on home features and attitude. The Colorado survey provides achievement data on a sizeable number of students (approximately 153,000) and measures performance at similar grade levels (3, 6, 9 and 11 vs. 1, 3, 6, 9 and 12 for Coleman). But Colorado's demographic profile is by school district, not school, and includes information generated by a relatively small number of educational and socio-economic variables. No questionaires were administered and no information was collected on school climate.

The Colorado survey does include, however, several components with potential for shedding light on Coleman's principal findings. The 1966 survey concluded that family background factors were far more associated with pupil achievement than educational factors. For example, Coleman found that parental level of education, the home's structural integrity (parental presence) and family income correlating moderately with achievement while factors such as per pupil expenditure and class size had little or no relationship. One of the only educational variables associated with achievement was teacher educational level. In the Colorado survey data are analyzed regarding such family background variables as parental education, single parenting, and family income. In addition, several school related factors are analyzed including teacher educational background.

Released in July 1986--twenty years to the month after the release of

Equality of Educational Opportunity--the Colorado test results provide a potentially rich data base for empirical inquiry. Although meager by comparison to Coleman's classic 1966 report, the forthcoming demographic and educational analysis has been designed to test the validity of Coleman's principal conclusions, two decades later, in Colorado.

METHOD

In April of 1986 nearly 154,000 students took the Iowa Test of Basic Skills/Tests of Achievement and Proficiency, Form G, a nationally standardized assessment of pupil competence in vocabulary, reading, language skills, work study skills, mathematics, social studies and science. Ninety percent of all students in grades 3, 6, 9 and 11 completed the entire test battery (see Table 1). In this analysis, pupil performance in reading is used as the achievement criteria.

The relationship between pupil performance in reading and the various background variables is analyzed by school districts. The district's demographic profile is taken from the 1980 census. The school district's educational composite was collected during the 1985-86 school year by the Colorado Department of Education.

In investigating the relationships, pupil performance in reading is the dependent variable and 17 background characteristics constitute the independent variables. The independent variables are classified in two groups: school-related variables and socio-economic/demographic variables (see Table 2.)

Multiple regression methods using stepwise entry of variables were used

TABLE I
Number of Colorado Students Taking Iowa Tests
By Grade and District Size

		Grade 3	Grade 6	Grade 9	Grade 11	Totals
All Students		39,100	37,161	42,039	34,834	153,134
District Size						
Over 25,000	(5)*	11,428	11,028	12,593	10,072	45,126
25,000-6,001	(14)	16,878	16,235	18,541	15,587	67,241
6,000-1,201	(39)	7,050	6,397	7,004	5,705	26,156
1,200-601	(25)	1,888	1,809	2,022	1,770	7,489
600-301	(37)	1,121	1,009	1,078	961	4,169
300-less**	(56)	725	677	799	735	2,936

* Number of districts this size
**Because of incomplete data, 28 of the 56 districts of this size are not included in the final anaysis

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TABLE 2

Socio-Economic Demographic Variables	School-Related Variables
% Of District In Urban Environment	Dropout Rate
% Single Parents	Pupil-Teacher Ratio
% College Graduates	Average Daily Attendance Entitlement, 1985
% High School Graduates	Mean Salary Of Teachers
% Hispanic Population	% Of Teachers With Masters Degrees
% White Population	Teachers' Average Experience In The District
% Black Population	Teachers' Average Total Teaching Experience
% Median Income	Expenditures From All Funds Except Building Funds/Per Student
% Of Population Below Poverty Level	

to determine the relationship between the school-related and socio-economic variables and achievement with the primary purpose being to identify the relative contribution of each of the two categories of variables. Due to missing data, 148 districts were included in the final analysis. Those districts dropped from the analysis were all districts with enrollments of less than 300 students, but were relatively heterogeneous on the remaining variables. The 148 districts in the analysis include an adequate representation of districts and students in Colorado. The results of the analysis are summarized below.

RESULTS

Stepwise multiple regression analysis were performed for each of the four grade levels studies, third, sixth, ninth, and eleventh grades. The dependent variable in each analysis consisted of the average score of district pupils in that grade in 1986 on the reading achievement measure of the Iowa Test of Basic Skills. Independent variables tested for prediction of achievement are listed in Table 2.

Results of the first regression on third grade achievement test scores are presented in Table 3. The analysis was successful in predicting 32% of the variability in achievement test scores across districts as represented by the adjusted R^2 of .32. Five variables, two socio-economic/demographic variables and three school-related variables, entered into the equation and all were statistically significant ($P<.03$) in predicting third grade reading achievement by district. Interestingly, the three school-related variables of dropout rate, teachers' salaries and average daily attendance entitlement were more highly related to achievement, as indicated by their Betas, than the

TABLE 3

Multiple Regression of Third Grade
Reading Achievement

Variable	b	Beta	t
Dropout Rate	5.7	-.41	5.70**
Teachers' Mean Salary	.004	.32	4.02**
Average Daily Attendance 1985	.001	-.19	2.42*
% College Graduates of Population	1.103	.18	2.36*
Hispanic Population	-.882	-.16	-2.30*

Adjusted R^2 = .32
a = 1039.94

* P<.03.
**P<.01.

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TABLE 4

Multiple Regression of Sixth Grade
Reading Achievement

Variable	b	Beta	t
Teachers' Experience In The District	17.02	-.66	-3.96**
Teachers' Total Experience	14.56	.53	3.18**
% College Graduates of Population	2.08	.25	3.20**
Hispanic Population	-1.66	-.23	-2.95**
% Income Under Poverty Level	1.30	.19	2.42*

Adjusted R^2 = .23
a = 1399.40

* P<.05
**P<.01.

socio-economic/demographic variables of college graduates and Hispanic population. All these variables showed the expected relationship with achievement. That is, the dropout rate, the size of the school district, and Hispanic population were negatively related to achievement while teachers' mean salary and the percentage of college graduates in the district were positively related to achievement scores.

Results for sixth grade reading achievement showed a slightly lower success in predicting achievement (R^2=.23), however, the prediction is still moderately successful (see Table 4). Again, both school-related and socio-economic/demographic variables enter the equation, but school-related variables remain quite powerful. In this case, teachers' experience is most predictive of achievement. As noted in previous research, teachers' experience in the present school district is negatively associated with achievement; that is, districts with teachers with the greatest experience in the district tended to have lower achievement. These findings may reflect the burnout of experienced teachers or, conversely, the motivation of newly-hired teachers. In contrast, total teacher experience is positively related to achievement. (As multiple regression presents the <u>independent</u> contribution of each successive variable in predicting the dependent variable, the positive relationship between total experience and achievement following the negative relationship between district experience and achievement is not impossible. Rather, the Beta between total experience and achievement reflects the relationship between total experience and achievement with the contribution of district experience to achievement removed.) These results indicate that while greater district experience leads to lower achievement, greater total experience enhances achievement. These

results suggest that teachers' skills in influencing achievement are enhanced as they gain experience; however, burnout or stagnation occurs as that experience builds in the same district. The socio-economic/demographic variables of percentage of Hispanic population and the percentage of college graduates in the district remain the strongest family or community variables in predicting achievement. Unexpectedly, the percentage of those in the district with income under poverty is weakly, but positively, related to achievement.

In examining the results of the regression analysis for the ninth and eleventh grade achievement scores (see Table 5), one notes two trends: the predictive power of the regression is lower (R^2=.19 for ninth grade; R^2=.18 for eleventh grade) and the school-related variables are no longer as predictive of achievement. Specifically, with ninth grade achievement scores, the most predictive variables are two variables reflecting the educational level of the district, percentages of college and high school graduates. (These variables, while related, do not approach a threat for multi-collinearity, $\underline{r}$= -.60, and, instead, appear to reflect simply different levels of education.) The district dropout rate is the third significant variable in this analysis. While dropout rate may technically be considered a school-related variable, it is, in fact, heavily intertwined with socio-economic/demographic variables as well. (For example, representative correlations of dropout rate with other variables in the study show dropout rates are associated with urbanicity (r^2=.46) and single parents (r^2=.35), as well as school-related variables such as pupil-teacher ratio (r^2=.41). Thus, by the ninth grade, the primary predictors of achievement are largely outside of specific school-controlled factors.

TABLE 5

Multiple Regression of Ninth Grade
Reading Achievement

Variable	b	Beta	t
% College Graduates Of Population	6.00	.53	5.63**
% High School Graduates Of Population	5.47	.38	4.08**
Dropout Rate	-4.91	-.19	-2.53*

Adjusted R^2 = .19
a = 1503.44

* P<.02.
**P<.01.

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TABLE 6

Multiple Regression of Eleventh Grade
Reading Achievement

Variable	b	Beta	t
Hispanic Population	-2.507	-.28	-3.66**
Median Income	.004	.26	3.38**

Adjusted R^2 = .18
a = 1859.43

**P<.001.

TABLE 7

Summary of Regression Results

Family Variables Which Significantly Predict Achievement				
Variables	Grades Predictive			
% College Graduates	3,	6,	9	
Hispanic Population	3,	6,		11
% High School Graduates			9	
Median Income				11

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School Variables Which Significantly Predict Achievement			
Variable	Grades Predictive		
Teachers' Mean Salary	3		
Average Daily Attendance	3		
Dropout Rate	3,		9
Teachers' Experience		6	

The results for eleventh grade achievement (Table 6) exemplify this trend. The sole predictive factor are median income of the district and Hispanic population. School variables no longer enter the equation at all.

DISCUSSION

These results suggest an impact of school-related variables on achievement, but their influence is restricted to the lower grades. As the years in school increase, ironically, the influence of school characteristics on achievement tends to diminish. This result could be due to a strengthening of environmental influences other than academic (peer and community mores) during adolescence. Another explanation for the decreased influence of school variables may lie in the dropout rate itself. The students completing achievement tests in the higher grades are not entirely the same group as those completing tests in the lower grades, before dropouts occur to any noticable extent. Perhaps, then, the data suggests that school variables can influence the achievement of the more heterogeneous population present in the lower grades, but as the population thins to those students most compatible with the school environment, variations in school characteristics become less critical.

Of course, the results of the present research are limited to the specific school and community/family variables examined in this study. Future research might examine other school-related variables which may show more of an effect on achievement, as compared to community/family variables. The research literature on effective schools have identified certain variables which supposedly differentiate effective and ineffective schools. Future research might examine the effect of some of these variables on achievement when community/family variables are considered. Unfortunately, data on these variables are more difficult

to collect. Sacrifices then need to be made in the number of schools or districts examined. The present study, with the goal of maximizing the statistical power and external validity of the results, chose to use data collected by the State Department of Education in order to achieve a large, heterogeneous sample.

In addition to limits imposed by the variables employed, it should be reiterated that the reporting entities in this study are districts, not schools. Accordingly, the educational units represent considerable variation in size, ranging from roughly 75,000 pupils in a district in Metropolitan Denver to 34 students in a district on Colorado s Eastern Plains (see Table 1). It should be recognized, however, that the great majority (89%) of Colorado school districts have fewer than 6,000 students, a significant majority (67%) have less than 1200 pupils and better than half of the districts (53%) have fewer than 600 pupils. Consequently, most of the reporting units in this study approximate an American metropolitan school in pupil size. It must also be acknowledged, however, that fewer than 29,000 of the roughly 153,000 students taking the Iowa Tests come from school districts with less than 6,000 pupils. Furthermore, all twenty-eight rural districts missing in the analysis because of incomplete test data have pupil enrollments less than 300.

Colorado's population does not represent America's population and thus, one must be cautious in making generalizations which transcend the state's boundaries. For example, only 4% of the students in this test analysis are black. (Indeed, only 53% of the school district reporting have ANY black students.) Nevertheless, the Colorado study does contribute to the growing body of empirical research prompted by Coleman's 1966 report which has examined the relationship among family

background, schooling and achievement. Similar to Coleman, the current survey finds that family variables are more related to achievement than are school variables, if one looks across grade levels (see Tables 7 and 8). Contrary to Coleman, however, is the finding that some schooling processes in the elementary grades are associated with predicting a greater variability in achievement than are the family variables. While family background appears to have a relatively uniform relationship to learning throughout most of a child's educational career, schooling appears to be a relatively powerful indicator of achievement variability in the earlier grades.

In conclusion, similar to Coleman, the significance of the Colorado study may have more to do with what it did not find than what it found. For example, it did not find that any significant relationship at any grade level between pupil achievement and the school related variables of pupil-teacher ratio, per pupil expenditure and teacher education. Regarding family background, interestingly, the present study found little or no relationship between pupil test performance and the socio-economic variables of median income, urbanization, race (Black or White), single parenting and degree of poverty. Just as it took further research nationally, following Coleman's study, to give illumination to the effects of schooling, and it may now take further research within Colorado to generate greater understanding of the relationships between the State's environmental conditions (family and schooling) and pupil achievement.

CONCLUSION

In order to gather greater meaning from two decades of research on compensatory education and on the Colorado study of pupil achievement, it is important to again address the underlying assumptions constituting a rationale for educational equalitarian initiatives.

1) THE TOTAL ENVIRONMENT HAS A PROFOUND INFLUENCE ON MEASURED INTELLIGENCE AND SCHOLASTIC ACHIEVEMENT

Although the sociological and psychological research typically suggests a rather strong relationship between genetic endowment and scholastic ability in a given population, empirical inquiry on people reared in contrasting conditions suggest that under significantly diverse circumstance, the environment takes on much greater dimension in determining variation in cognition. The pre-compensatory education research on identical twins raised separately and on adopted children, formally institutionalized, lent credibility to the environmental hypothesis in explaining the low scholastic aptitude of the socio-economically disadvantaged population.

More recent research by Scarr and Weinberg (1976) on adopted children and by Jensen (1977) on black children in Georgia have been interpreted as supporting this significance of environmental circumstance. The former study of 166 black and mixed race children from twelve states found that after residing several years with their white adoptive parents, their average respective IQs stood at 97 and 109. More importantly, both the black and interracial children were above the national norm on standardized reading and math tests. The Jensen study

noted a "significant and substantial" decline in the IQ (between fourteen and sixteen points) of rural Georgia blacks (but not whites) between six and sixteen, which he concluded "...would seem to favor an environmental interpretation [at least under this social condition] of the progressive IQ decrement." Although Jensen (1974) did not report a similar decline in a sampling of Berkley, California, blacks (only a seven IQ point decline in verbal IQ and no decrease in nonverbal between kindergarten and sixth grade), his Georgia study makes a case for the debilitating cognitive effects of poor social condition. Consequently, it is suggested that the differences in cognitive processes that such empiricists as Deutsch, Bernstein and Lewis found, between the "culture of poverty" and the culture of the mainstream, significantly affected differences in measured intelligence and scholastic achievement.

The Colorado study also lends support to an environmentalist explanation of scholastic variation, principally by its finding that after holding several demographic and school related variables constant, parental college education is moderately associated with pupil achievement. Further research which includes I.Q. as one of the independent variables would give greater illumination to the power of environmental condition in Colorado.

2) SCHOOLS ARE AN IMPORTANT PART OF THE TOTAL ENVIRONMENT

Since Coleman's 1966 conclusion that schooling brought little influence to bear on scholastic achievement, an abundance of research has found formal education contributing meaningfully to variations in scholastic attainment. Earlier research on school closings had testified to the validity of this assumption and more recent research by the likes of

Rutter, Rosenshine, Gage and even Coleman (1982a, 1982b, 1985) support the significance of schooling. In body, the research on compensatory education also supports the hypothesis that "schools make a difference," given the reported moderate to modest gains experienced by most children in such investigations as SES and SASC studies. Furthermore, the Colorado study provides testimony to the affects of schooling by its finding that in the elementary grades school related variables correlate moderately with pupil achievement.

Regarding the question of what instructional strategy works best over time, it was hoped that this review would shed more light. While there is some evidence that the more holistic preschool programs have greater sustenance and that the parent education and child centered Follow Through models carry endurance, one of the most effective compensatory programs appears to be Direct Instructional Project Follow Through, which is reporting significant cognitive effects up to grade nine. Unfortunately, the SES did not assess the multi-year effects of instructional variation. Obviously, those interested in getting any handle on the instructional sustenance issue must go beyond the body of research on compensatory education.

3) IMPROVED SCHOOLING FOR DISADVANTAGED CHILDREN CAN COMPENSATE FOR INADEQUACIES IN MEASURED INTELLIGENCE AND SCHOLASTIC ACHIEVEMENT CAUSED BY INADEQUACIES IN THE TOTAL ENVIRONMENT

Despite the impressive effective gains reported by compensatory preschool initiatives and the promising achievement gains associated with the less disadvantaged SES children, many children in specific Chapter 1 programs, and graduates of several Follow Through programs, it

appears irrefutable that schooling has been unable to close the achievement gap between the average student and the socio-economically disadvantaged. Launor Carter, Manager of SES, has called this goal "unrealistic," even though his data may be the most promising to date on the ability of schooling to equalize the achievement rate of pupils with varying environmental background. It should be noted, however, that Carter found that most CE children (60%) in his national sample were not below the poverty level and did not come from a home environment markedly different from the regular student. Neither his study nor the SASC offers any demographic data on their "most educationally disadvantaged" sub-samples, but it is probable, given the modest to moderate relationship that SES and other studies have found between family background and achievement, that the "most disadvantaged" sub-samples have a proportionately greater number of children who are socio-economically impoverished.

The National Assessment of Educational Progress (NAEP) has reported (Forbes, 1985, and The Reading Report Card, 1985) impressive scholastic gains between 1970-1984 of historically low-achieving students. For example, in similar assessments of reading achievement between 1970 and 1980, black nine year-olds outgained their white counterparts roughly ten percentage points to three. NAEP samples of Hispanics, impoverished urban children and low-income rural children have revealed less dramatic but similar achievement improvement. Moreover, the NAEP data found children in schools receiving Title I funds performing better than similar children in non-Title I schools. With such encouraging long-term data, it may be hard to digest the more pessimistic findings regarding the "most disadvantaged" in Carter's Sustaining Effects Study and Gabriel's Sustaining Achievement Study of Chapter 1 Students.

But the compensatory education studies and the NAEP reports are measuring different populations. It is important to recognize that NAEP did not assess Chapter 1 children per se and that a significant percentage of say blacks and Hispanics (historically lower performing students who have never been in Title I or may have "graduated" after a short stay) may have indeed improved their achievement status. It is also possible that improved social conditions among significant percentages of the historically underachieving populations accounts for NAEP results. For example, despite the maintenance of a sizable black underclass, the fact that the black middle class has roughly doubled in the last twenty years may account far more for improved achievement than the process of schooling. Writing in the mid 1960s, Oscar Lewis contended that the "culture of poverty" was decreasing in the United States. With greater desegregation of society and greater opportunity for upward mobility, the decline of the debilitating cultural characteristics associated with poverty (attributing the future to fate, present time orientation and feelings of hopelessness) may be positively effecting pupil achievement.

In reflecting on the two decades since Coleman's 1966 Equality of Educational Opportunity Survey, it is suggested that the provocative document is classic, not because of its conclusion that schooling was ineffective but because it has forced us to question just how effective schooling can be. The Colorado study finds some schooling processes significantly related to pupil achievement, but the influence of these educational variables appear to be limited to the early grades. In addition, most investigations in the industrialized nations on effects of schooling have concluded that pupil background explains more about variations in scholastic achievement than does schooling (Peaker, 1971;

Heyeman and Loxley, 1983). Indeed, these findings on schooling effects and the findings on the limited success of compensatory education should come as little surprise given the collective illogic of the underlying assumptions which constituted a rationale for egalitarian education.

Given the probability that (1) the total environment can have a profound influence on measured intelligence and scholastic achievement and (2) the fact that schooling is a significant part of the total environment, is it logical to assume that (3) improved schooling for socio-economically disadvantaged children can compensate for the inadequacies of the total environment? Simply stated, compensate means "make up for" and the part is not equal to the whole. It defies reason to expect that a dosage of cognitive medicine at age three in Head Start or an extra period of reading for a year at age seven in Title I will "catch children up" for a sustained period.

Moreover, the "great equalizer" assumption was in defiance of early research that gave little credibility to a "critical period" hypothesis or that a model compensatory schooling was narrowing the achievement gap. Indeed, it is unfortunate that the investigations of Lee and Kirk and Higher Horizons and Glass were not given scrutiny earlier, for if we had approached educational initiatives to equalize achievement more realistically, we would view the modest gains reported by compensatory education as more educationally significant. In addition, if we had recognized sooner the underlying significance of Coleman's finding regarding the importance of environmental circumstance, relative to schooling, we may have viewed Head Start and Title I/Chapter 1 in a more favorable light.

In summary, if the inequalities in the environment are principally responsible for the inequalities in achievement, then probably the only way to significantly reduce the inequalities in achievement is to significantly reduce the inequalities in the environment. In the meantime, in the field of education, that part of the environment that is compensatory schooling, may be one of our most important, though modest, egalitarian strategies.

BIBLIOGRAPHY

Anastasi, A.: Psychological Testing, New York: McMillan Publishing Co., 1982.

Ausubel, D. and Ausubel, P.: "Ego Development Among Segregated Negro Children." Education in Depressed Areas, A. Harry Passow (Ed.), New York: Teachers College Press, Columbus University, 1963.

Bache, W. and Nauta, M.: Home Start Followup Study: A Study of Long-Term Impact on Home Start on Program Participants. Executive Summary. Administration for Children, Youth, and Families (DHEW), Washington, D.C.: ERIC Document Reproduction Service, Ed 192904, 1979.

Becke, W. C. and Gersten, R.: "A Follow-up of Follow Through: The Later Effects of The Direct Instruction Model on Children in Fifth and Sixth Grades." American Educational Research Journal, 19(1): 75-92, Spring, 1982.

Bloom, B.: Stability and Change in Human Characteristics, New York: John Wiley and Sons, Inc., 1964.

Brown, R. and Duffy, J.: Report of the Chapter 1 Sustained Effects Study. Education Consolidation and Improvement Act - Chapter 1, ERIC Document Reproduction Service, ED 253577, 1984.

Carter, F.: A Study of Compensatory and Elementary Education: The Sustaining Effects Study. Final Report. Office of Program Evaluation (ED), Washington, D.C. ERIC Document Reproduction Service, ED 24699, 1983.

Claus, R. and Girrbach, C.: Long-Term Sustained Effects of Chapter 1 Participation, 1979-1982. ERIC Document Reproduction Service, ED 227147, 1982.

Coleman, J., et al.: Equality of Educational Opportunity. Washington, D.C.: U.S. Department of Health, Education and Welfare, U.S. Government Printing Office, 1966.

Coleman, J.: "Summer Learning and School Achievement." Public Interests, 66, Winter, 1982

Coleman, J.: "Public Schools, Private Schools and the Public Interest." American Education, 18: 17-22, Jan/Feb, 1982.

Coleman, J.: "International Comparisons of Cognitive Achievement." Phi Delta Kappan, 66(6):403-6, Feb. 1985

"Compensatory Education Study." Washington, D.C., U.S. Government Printing Office, September, 1978, p.83.

Darlington, R., et al.: Preschool programs and later school competencies. "Science", 208(4440): 202-204,1980.

Denham, C. and Lieberman, A.,: Time to Learn. California Commission for Teacher Preparation and Licensing, May, 1980.

Deutsch, M.,: "Facilitating Development in the Pre-School Child: Social and Psychological Perspectives," Merrill-Palmer Quarterly, 10:249-63, 1964.

DeVito, P. and Rubenstein, S.:"A Follow-Up Study of Title I Participants in Rhode Island." Paper presented at the annual meeting of the American Educational Research Association, San Francisco, California, April 8-13, 1979.

Edmonds, R.: Effective Schools for the Urban Poor. Educational Leadership 37(1),15-18, October, 1979.

Education, Office of the: Education of the Disadvantaged: An Evaluation Report on Title I, Elementary, Secondary Education Act of 1965, Fiscal Year 1968, Washington, D.C., ERIC Document Reproduction Service, 1970, ED 047033.

Erlenmeyer-Kimling, L. and Jarvik, L. F.: "Genetics and Intelligence: A Review," Science, 142, 1477-79, 1963.

Evans, E. D.: Longitudinal Follow-up Assessment of Differential Preschool Experience for Low Income Minority Group Children. Journal of Educational Research; 78 (4) 197-202, Mar-Apr, 1985.

Forbes, R.: "Academic Achievement of Historically Lower-Achieving students during the Seventies" Phi Delta Kappan 66 (8): 542-4, April, 1985.

Freeman, R.: "The Alchemists in Our Public Schools," quoted by John M. Ashbrook in the House of Representatives, Congressional Record, 10324-10331, April 24, 1969.

Gabriel, R.M., et al.: Studying the Sustained Achievement of Chapter 1 Students, Chapter 1 Evaluation and Assistance Centers, January, 1985.

Gage, N.L.: "What Do We Know About Teaching Effectiveness?" Phi Delta Kappan, 66(2): 87-93, October, 1984.

Gersten, R., et al: "The Lasting Inpact of the Direct Instructional Follow Through Program: Preliminary Findings of a Longitudinal Study of 1500 Students." Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, Louisiana, April, 1984.

Gray, S.W.: Enduring Effects of Early Intervention: Perspectives and Perplexities. Peabody Journal of Education, 6(3): 70-84, Spring, 1983.

Hawkridge, D. G., et al.: A Study of Selected Exemplary Programs for the Education of Disadvantaged Children, Part I, Palo Alto, California: American Institute for Research in the Behavioral Sciences, ERIC Document Reproduction System, ED 023 776, 1968; Part II ED 036 668, 1969.

Hoepfner, R.: How Important Is Summer School?" Educational Leadership. 38(3): 80-82, October, 1980.

Hornquist, K.: "Enduring Effects of Schooling: A Neglected Area of Research." Educational Research, 6:5-11, November, 1977.

Hubbell, R.: A Review of Head Start Research Since 1970. Head Start Evaluation, Synthesis and Utilization Project. Administration for Children, Youth, and Families (DDHS), Washington, D.C., ERIC Document Reproduction Service, ED 248 994, 1985.

Humphrey, J.: "A Longitudinal Study of the Effectiveness of Full-Day Kindergaren." Board of Education, Evansville, Indiana, ERIC Document Reproduction Service, ED 247 014,1983

Hunt, J.: Intelligence and Experience, New York: Ronald Press, 1961.

The Impact of Head Start: An Evaluation of the Effects of Head Start on Children's Congnitive and Affective Development., ERIC Document Reproduction Service, ED 036 321, 1969.

Jensen, A.: Cumulative Deficity: A Test Hypothesis? Developmental Psychology, 10(6): 996-1019, 1974.

Jensen, A. R.: "The Heritability of Intelligence" Readings in Child Development, Second Edition, H. Munsinger (Ed.), New York: Holt, Rienhart and Winston, 131-135, 1975.

Jensen, A.: Cumulative Deficit in I.Q. of Blacks in the Rural South. Developmental Psychology, 13(3): 195-196, 1977.

John, V. P.: "Intellectual Development of Slum Children: Some Preliminary Findings," American Journal of Orthopsychiatry, 33, 813-22, 1963.

Keesling, J.W.: "Differences Between Fall-to-Spring and Annual Gains in Evaluation of Chapter I Programs." Education Analysis Center for State and Local Grants, 1984.

Kennedy, M.M., Birman, B.F., Demaline, R.E.: The Effectiveness of Chapter 1 Services, Washington, D.C.: U.S. Government Printing Office, July, 1986.

Kirk, J. A.: Early Education of the Mentally Retarded, Urbana, Illinois: University of Illinois Press, 1958.

Lavin, R. J. and Sanders, J. E.: Longitudinal Evaluation of the Computer Assisted Instruction, Title I Project, 1979-82. Merrimack Education Center, Chelmsford, Mass. ERIC Document Reproduction Service, ED 234 119, 1983.

Lee, E. S.: "Negro Intelligence and Selective Migration : A Philadelphia Test of the Klineberg Hypothesis," American Sociological Review, 16: 227-33, 1951.

Levy, R.: "Effects of Institutional vs. Boarding Home Care on a Group of Infants," Journal of Personality, 15: 233-41, 1947.

Lewis, O.: Five Families: Mexican Case Studies in the Culture of Poverty, New York: Basic Books, 1959.

Lewis, O.: The Children of Sanchez: Autobiography of a Mexican Family, New York: Random House, 1961.

Lewis, O.: La Vida. A Puerto Rican Family in the Culture of Poverty, San Juan and New York, New York: Random House, 1965.

Maraschiello, R.: Longitudinal Analysis of Follow Through Participants, 1968-69 through 1977-78. Report Number 7971. Office of Education (DHEW), Wahington, D.C. ERIC Document Reproduction Service, 1979.

Marcus, L.R. and Stickney, B.D.: Race and Education: The Unending Controversy, Springfield, Illinois: Charles C. Thomas, 1981.

McLaughlin, M., et al.: The Effects of Title I ESEA: An Exploratory Study. Arlington, VA., ERIC Document Reproduction Service, ED 073 216, 1971.

McLaughlin, M.: Evaluation and Reform: The Elementary and Secondary Education Act of 1965, Title I, San Monica, CA: The Rand Corporation, 1974.

Meyer, L. A.: "Long Term Effects of the Direct Instruction Project Follow Through." The Elementary School Journal, 84(4), 380-94, 1984.

Miller, L. B. and Bizzell, P.: Long-Term Effects of Four Preschool Programs: Sixth, Seventh, and Eighth Grades. Child Development, 54 (3): 727-41, Jun 1983.

Mullins, S.P. and Summers, A.A.: "Is More Better? The Effectiveness of Spending on Compensatory Education," Phi Delta Kappan, 64 (5): 339-47, January, 1983.

Neissen, quoted in Bahrick, Harry P.: "Semantic Memory Content in Permastore: Fifty Years of Memory for Spanish Learned in School." Journal of Experimental Psychology: General, 113(1): 1-29, Mar, 1984.

Nieman, R. H. and Gastright, J. F.: "The Long Term Effects of Title I Preschool All-Day Kindergarten." Phi Delta Kappan, 63 (3): 184-85, Nov. 1981.

Newman, H. H., Freeman, F.N., and Holzinger, K. V.: Twins, A Study of Heredity and Environment, Chicago: The University of Chicago Press, 1937.

Passow, A. H. (Ed.): Education in Depressed Areas, New York: Teachers College Press, Columbus University, 1963.

Powers, S.: A Comparison of Cognitive Gains of Seventh, Eighth and Ninth Grade Students Across Two Years of Title I. Paper presented at the annual meeting of the American Educational Research Association, Boston, April 7-11, 1980.

The Reading Report Card, Educational Testing Service, Princeton, N.J., September, 1985.

Revicki, D. and Self, B.: The Impact of Preschool Experience and the Parent Education Follow Through Program on Academic Achievement: A Longitudinal Study Through Grade 5. ERIC Document Reproduction Service, ED 195 347, 1980.

Rosenberger, B.: "Recent Research on Teacher Behaviors and Student Achievement." Journal of Teacher Education, 27 (1): 61-64, Spring, 1976.

Rutter, M., et al.: Fifteen Thousand Hours: Secondary Schools and Their Effects on Children, Cambridge, Mass.: Harvard University Press, 1979.

Scarr, S. and Weinberg, R.: I.Q. Test Performance of Black Children Adopted by White Families. American Psychologist, 31(10): 726-739, 1976.

Schweinhart, L. J., et al.: "The Promise of Early Childhood Education." Phi Delta Kappan, 66(8): 548-51, April, 1985.

Schweinhart, L. J. and Weikart, D. P.: "Evidence That Good Early Cholhood Programs Work." Phi Delta Kappan, 66(8): 545-51, April, 1985.

Skeels, Harold M., "Effects of Adoption of Children from Institutions," Children, 33-34, January-February, 1965.

Skeels, H. M. and Dye, H. B., "A Study of the Effects of Differential Stimulation on Mentally Retarded Children," Proceedings of the American Association of Mental Deficiency, 44: 114-136, 1939.

Spitz, R.: Hospitalism, An Inquiry into the Genesis of Psychiatric Conditions in Early Childhood. Psychoanalytic Study of the Child, I.: 53-74, 1945.

Stebb, S., et al.: Education As Experimentation: A Planned Variation Model. Cambridge, Mass: Abt Associates, 1977.

Stickney, B. D.: "Fading Out of Gains in Successful Compensatory Education Programs." Urban Education, 12: 271-82, Oct, 1977.

Stickney, B.D.: "Compensatory Education: Its Effectiveness and Its Limitations," Paper presented at the American Educational Research Association Annual Meeting, New York, March 19-23, 1982.

Stonehill, R.: From a telephone conversation with Robert Stonehill, Office of Planning, Budget, and Evaluation, U.S. Department of Education, May 2, 1986.

Szenda, M. J., et al.: The Later Effects of the Parent Education Follow Through Program on Achievement Scores for the Matched Pairs of Program Children and Their Non-Program Siblings. Department of Education, Washington, D.C. ERIC Document Reproduction Service, ED 247 356, 1984.

Tallmadge, G.: Interpreting NCEs. Mountain View, California, RMC Research Corporation, October, 1976, p. 3.

United States Commission on Civil Rights, 1967. Racial Relationships in the Public Schools, Vol. I, U.S. Government Printing Office, Washington, D.C., 1967.

Wang, M.: Evaluating the Effectiveness of Compensatory Education. Paper presented at the annual meeting of the American Education Research Corporation, Boston, Massachusetts, April 7-11, 1980.

Wargo, M. J., et al.: Further Examination of Exemplary Programs for Educating Disadvantaged Children, American Institute on Research in the Behavioral Sciences, Los Angeles, California, ERIC Document Reproduction Services, ED 055 128, 1971.

Wargo, M. J., et al.: ESEA Title I: A Reanalysis and Synthesis of Evaluation Data from Fiscal Year 1965 to 1970. American Institute for Research, Palo Alto, California, ERIC Document Reproduction Service, ED 059 415, 1972.

Wrightstone, J. W., et al.: Evaluation of the Higher Horizons Program for Underprivileged Children, Bureau of Educational Rsearch, Board of Education of the City of New York, 1964.